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**TITLE: ADJUSTABLE CONNECTION OF A FRONT PANEL TO A
DRAWER BODY
FOR FURNITURE**

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ABSTRACT:

**CHG DATE=19990617 STATUS=O> The invention relates to assembling a
body 1 and**

a front panel 2, for example in order to constitute a drawer or a furniture element. The body 1 of the box element comprises two pairs of engagement bridges 3 and 4, in which there is housed, by introduction from the bottom upwards, fittings distributed in two pairs over the rear face of the front panel 2. Each pair of fittings has an eccentric transverse pin parallel to the direction of the arrow IV, which may be rotated with a tool. Application: removable and indefinitely reusable assembly allowing, in addition, the alignment of the front panel 2 to be adjusted in all directions, with respect to the surrounding elements of the item of furniture. <IMAGE>

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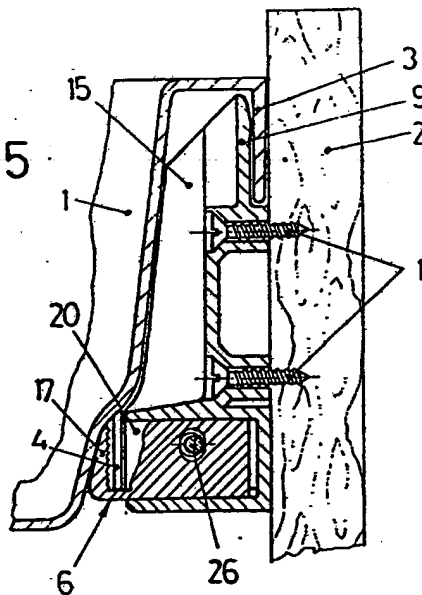
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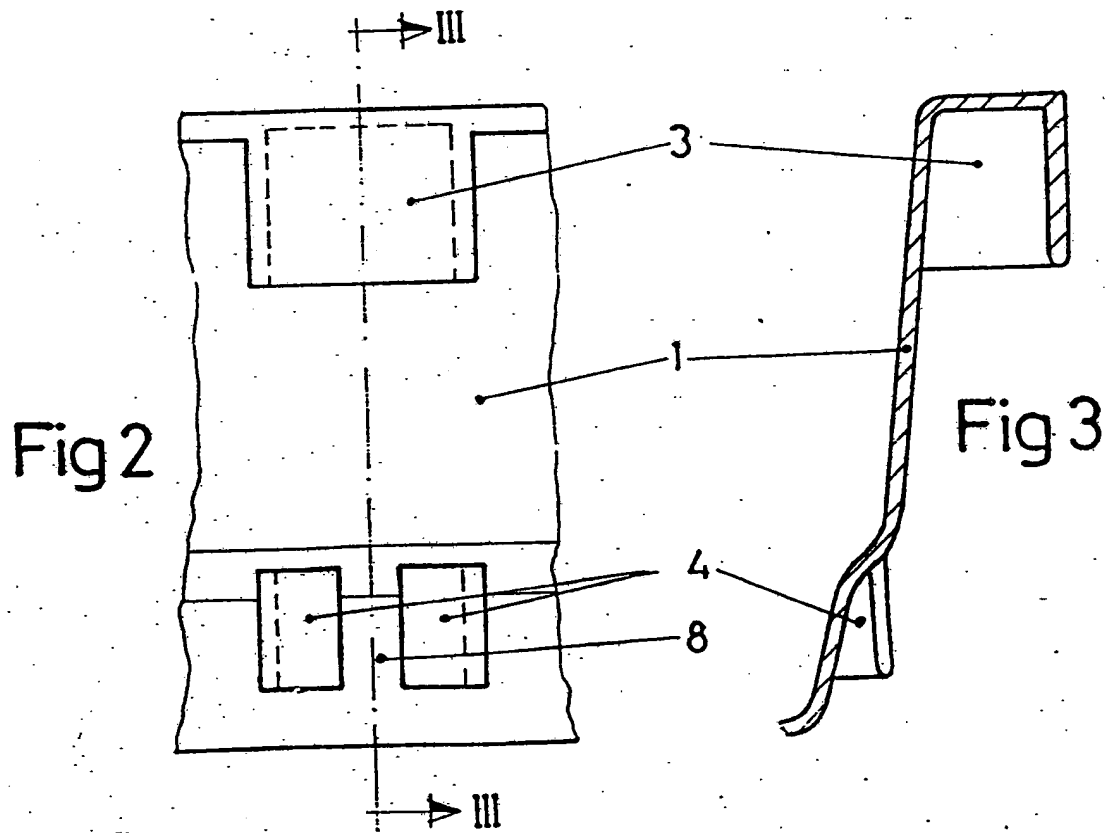
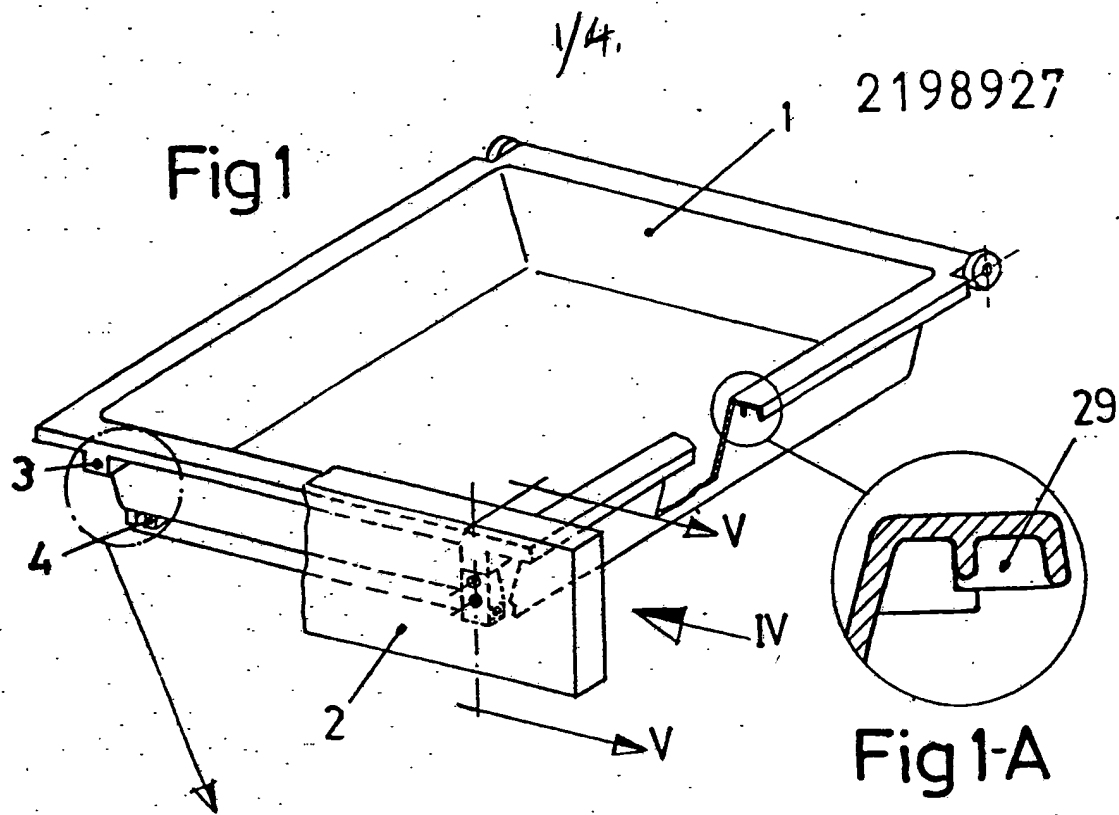
(54) Adjustable connection of a front panel to a drawer body for furniture

(57) A device for adjustable connection of a front panel (2) to a drawer body (1) for furniture, comprises a number of assemblies, preferably two, each consisting of two engagement members, an upper one (3) and a lower one (4), constructed in the body of the drawer, one above the other and offset horizontally, and a fixing assembly of two pieces, a vertical one and a horizontal one (6), the vertical piece being secured to the front panel (2) of the drawer by screws (11), these pieces being capable of being joined to each other at right angles and inter-connected by means of a transversal shaft provided with a cam (26), the two pieces having heads (9, 17) for vertical penetration into channels formed by the engagement members, the width of the heads being smaller than that of the channels of the engagement members, so that the heads of the two pieces can be caused to penetrate the respective channels from the bottom upwards and in this position the panel can be adjusted relative to the drawer both in the horizontal and the vertical direction, and thereafter by rotating the eccentric shaft, a tractive force can be applied to the horizontal piece (6) resulting in close engagement with the walls of the engagement members (4), thus fixing the panel to the drawer in the selected position.

Fig 5



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Fig 5

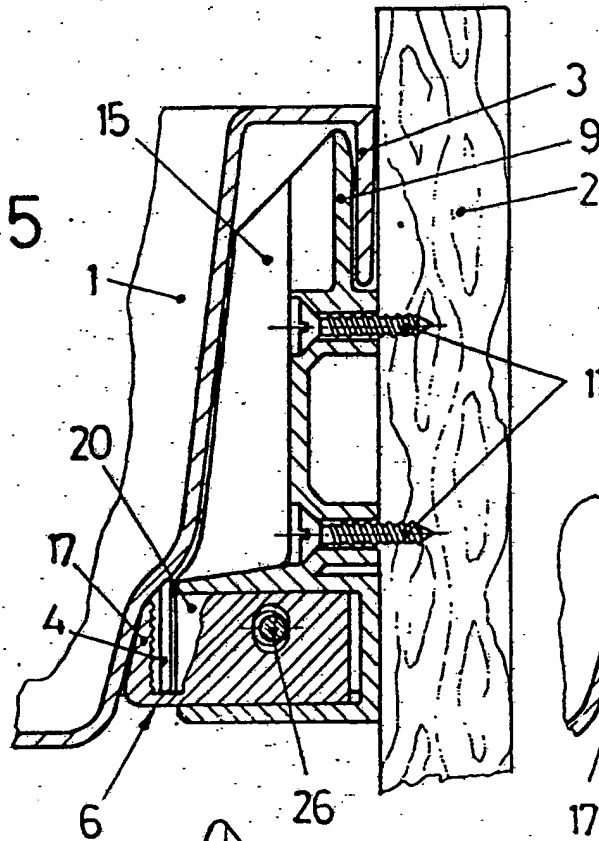


Fig 6

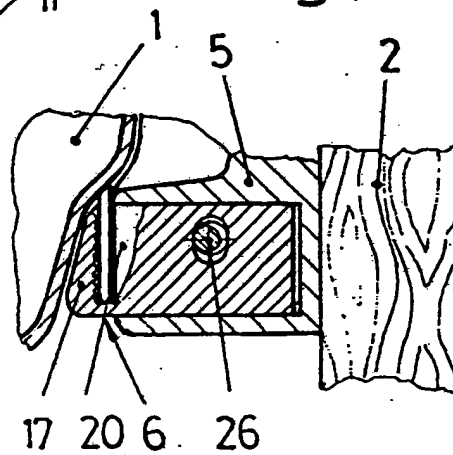
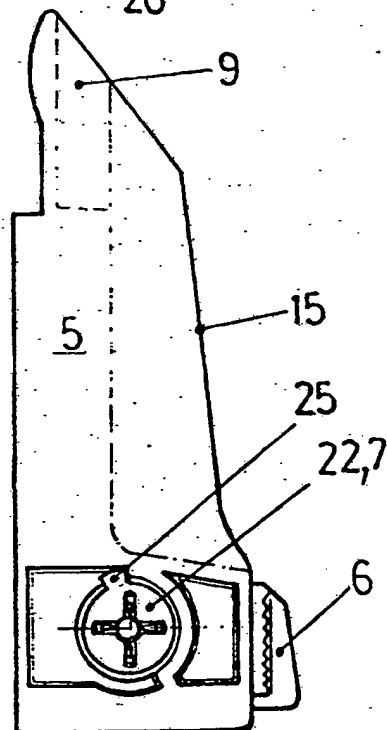
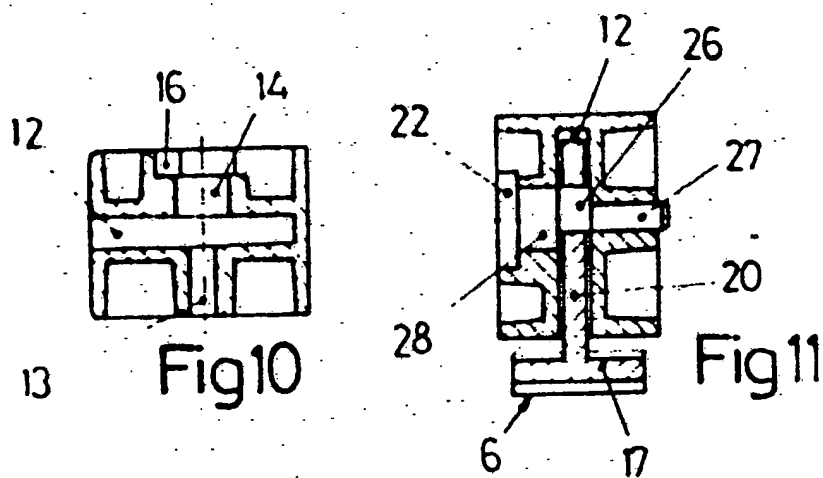
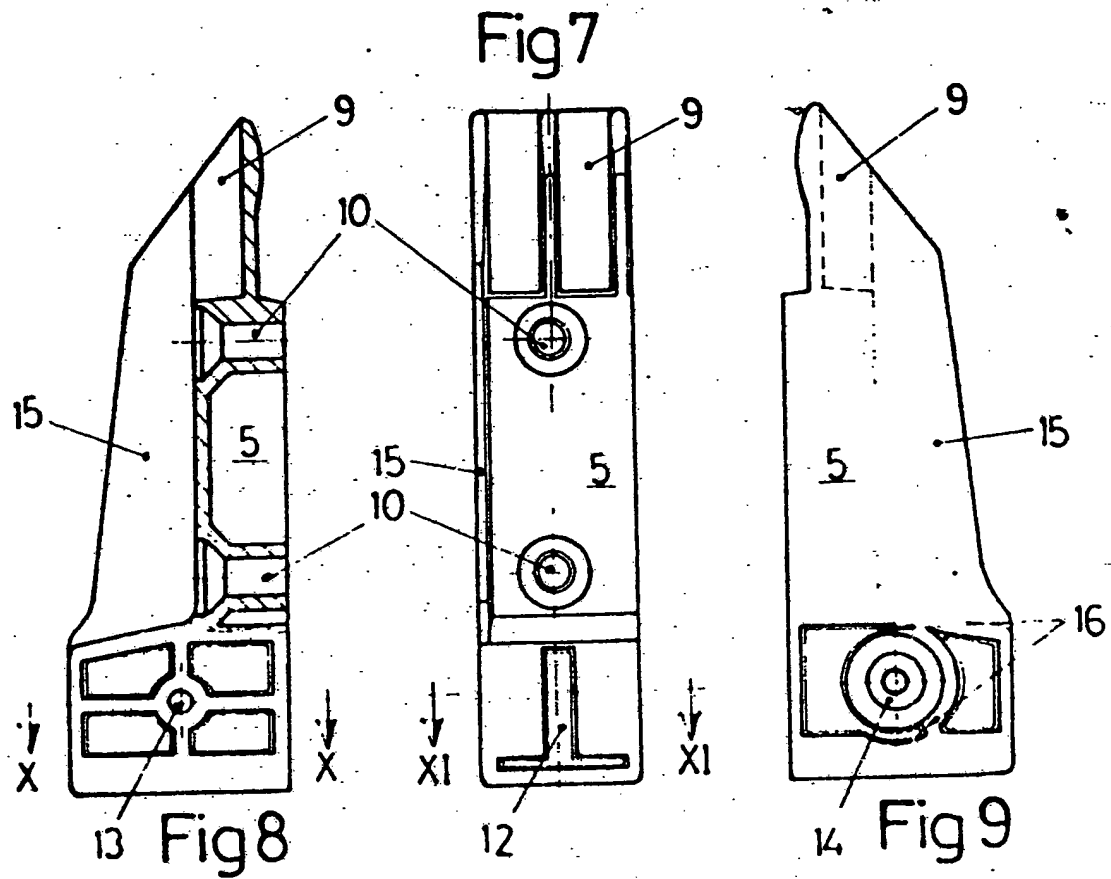
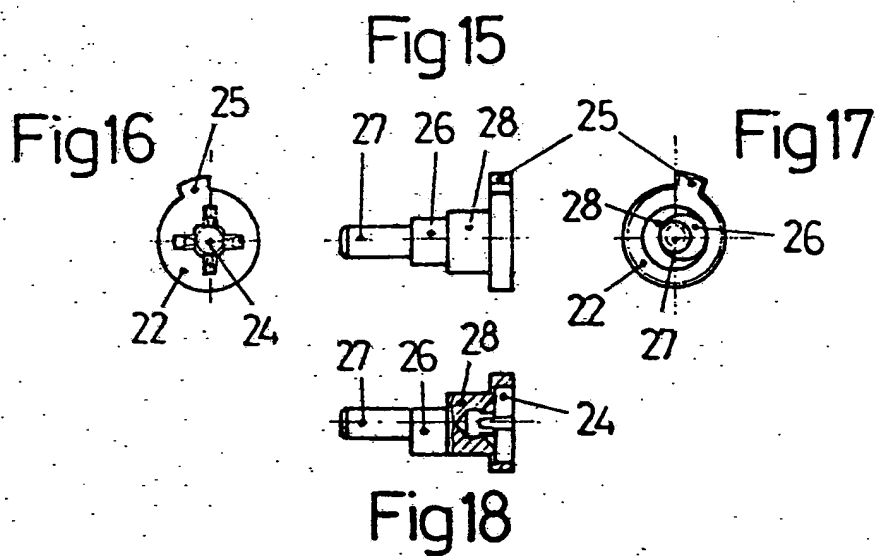
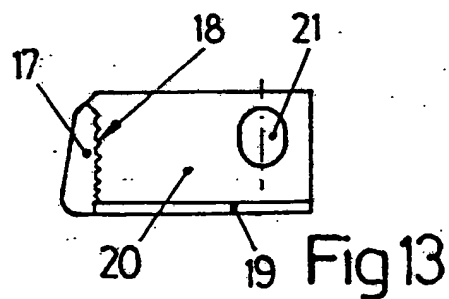
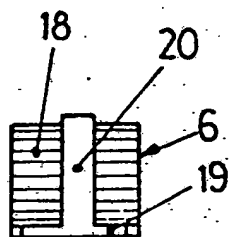
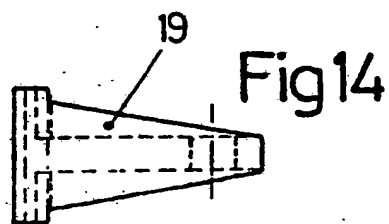


Fig 4







DEVICE FOR ADJUSTABLE CONNECTION OF A FRONT PANEL TO A DRAWER BODY FOR FURNITURE AND FURNITURE INCORPORATING A DRAWER SO FORMED

This invention relates to a device for adjustable connection of a front panel to a drawer body for furniture and furniture incorporating a drawer so formed.

In addition to the conventional methods for the construction of drawers by the assembly of various separate elements forming the side, front and rear panels and the base, there are also processes in which the body of a drawer is formed in one single piece, generally moulded in plastics or a similar material, in itself comprising the side panels, the rear panel and the base, the said single-piece drawer body being joined to an independent front panel by means of some connection device.

The purpose of the present invention is to provide a connecting device between a single-piece drawer body and its front panel.

Various securing devices are already known, ranging from the simple process of screwing the drawer body onto the back of the front panel to other more modern and more complex devices based on means for the mutual engagement of the drawer body and/or the front panel.

These latter more complex devices are a response to attempts to solve a set of problems relating on the one hand to certain aspects of the actual connection between the body and the front of the drawer and on the other to certain factors arising in the operation of ensuring the appropriate relative position between the said body and the front and the task of enabling the said position to be varied within certain limits.

The known devices do not completely solve the problems arising in these connections, either because they do not provide a complete solution or because they necessitate a complex operation for their assembly and/or positioning.

The present invention provides a device for the

adjustable connection of a front panel to a drawer body for furniture, comprising a pair of engagement members each defining a channel, the engagement members forming part of or being adapted to be secured to one of the drawer body and the front panel one above the other with the channels opening in a common direction and spaced horizontally from one another, a fixing assembly comprising first and second inter-engagable fixing pieces, the first of which is formed as part of or is adapted to be secured to the other of the drawer body and front panel, each fixing piece having a head which when the pieces are loosely inter-engaged is slidable as a loose fit into a respective one of the channels, and means for expanding/contracting the fixing assembly so as to lock the fixing pieces relative to one another and the walls of the channels to fix the fixing assembly in the channels.

In this system, as it will be realised, the regulation of the position of the body and the front in the lateral direction is rendered possible by the greater internal width of the engagement members by comparison with the penetration heads, while the regulation in the vertical direction is rendered possible by the greater or smaller degree of penetration of the heads in the engagement members; the possibility of combining the two regulating actions also makes it possible to vary the relative angular position between the body and the front of the drawer.

In a preferred form the invention provides a device for adjustable connection of a front panel to a drawer body for furniture, comprising a number of assemblies, preferably two, each consisting of two engagement members, an upper one and a lower one, constructed in the body of the drawer, one above the other and offset horizontally, and a fixing assembly of two pieces, a vertical one and a horizontal one, the vertical piece being secured to the front panel of the drawer, these pieces being capable of being joined to each other at right angles and inter-connected by means of a transversal shaft provided with a cam, the two pieces having

heads for vertical penetration into channels formed by the engagement members the width of the heads being smaller than that of the channels of the engagement members, so that the heads of the two pieces can be caused to penetrate the respective channels from the bottom upwards and in this position the panel can be adjusted relative to the drawer both in the horizontal and the vertical direction, and thereafter by rotating the eccentric shaft, a tractive force can be applied to the horizontal piece resulting in close engagement with the walls of the engagement members, thus fixing the panel to the drawer in the selected position.

The main advantages of this connection device are as follows:

-- A practicable connection is obtained by a simple operation in which it is sufficient to subject a cam to a rotation of one hundred and eighty degrees to release or secure the connection, numerous operations thus being feasible without causing the mechanism to deteriorate, as they are effected without any threading for the elements concerned.

-- A connection which renders it possible to regulate the relative position between the body and the front of the drawer at all times, so that the said front can in every case be correctly aligned with the other front panels or locating means of the exterior of the article of furniture.

-- An extremely simple assembly principle based on simple operations of fitting the parts into one another with the application of pressure.

-- Independent means of regulating the relative position between the body and the front, in relation to other securing means

of which the function is merely to fix the parts concerned in position, so that the regulating actions leave the situation of the securing means in relation to the front of the drawer completely unaffected.

With advantage the active face of the penetration head of the horizontal piece is grooved and prolonged in the form of a body of the shape of an inverted T converging towards the end which connects with the vertical piece, the said body forming a base plate and a vertical rib system, containing a window which is open vertically and in which the cam of the transversal shaft acts, the wall of the lower engagement member having a vertical groove of a width greater than the thickness of the vertical rib system of the horizontal piece, this rib system ensuring the suitable behaviour of the piece in the traction exerted for securing purposes, when the wall of the lower engagement member is gripped between the grooved surface and the rear edge of the vertical piece.

Preferably the vertical piece is provided with a housing of the shape of an inverted T formed by the body of the horizontal piece and respective cylindrical orifices are formed coaxially face to face between which the vertically opened window can position itself in order to receive the transversal shaft for assembling the horizontal and vertical pieces.

The transversal shaft may consist of a bar with respective cylindrical end portions dimensioned to enable them to rotate in the face to face orifices, the cam being provided between the cylindrical portions and having a diameter in accordance with the opened window in which it acts, the transversal shaft terminating at one end in an enlarged part having a cavity for insertion of a tool for its rotation and having a peripheral projection which in conjunction with respective stops on the vertical piece determines the end of the angular travel of the eccentric shaft.

To improve appearance the vertical pieces closest to the sides of the drawer body have in relation to one another a symmetrical configuration whereby the vertical pieces have a terminal wing on their side facing towards the exterior of the drawer, the profile of the wing being in accordance with the cavity between the front panel and the body of the drawer thus ensuring an aesthetically pleasing finish to the visible sides of the drawer when it is open, preferably the indentations for the operation of the transversal shaft being situated in this visible wing.

DRAWINGS AND REFERENCES.

To enable the nature of the invention to be understood more clearly we show in the attached drawings a preferred industrial embodiment thereof which is purely of the nature of an example serving to illustrate it and without any limitative effect.

Fig.1 is a view in perspective, showing a device for the adjustable connection of a front panel, designed in accordance with the invention, only part of the front panel being shown and a portion having been cut away from the side panel, taking the form of a rail 29 or lateral guide for the opening and closing movement.

Fig.1A is a view, on a larger scale, of the detail of Fig.1, i.e. of the guide rail 29 for the drawer.

Fig.2 is a view, on a larger scale, of another detail of Fig.1, i.e. the upper and the lower engagement bridge, 3 and 4 respectively.

Fig.3 is a view along the line III-III of Fig.2, showing the internal housing of the engagement bridges 3 and 4, as regards its depth and height.

Fig.4 is a view, on a larger scale, in the direction indicated by the arrow IV; the body 1 and the front 2 have been omitted, the diagram being confined to the assembly of the vertical piece 5, the horizontal piece 6 and the transversal shaft 7.

Fig.5 is a section along the line V-V of Fig.1 and shows the details of the assembly of the connecting device, which occupies the actual position in which the horizontal piece 6 is not gripping the lower bridge 4.

Fig.6 is a view similar to the preceding view and shows the position in which the lower bridge is gripped by the horizontal piece 6; for the sake of simplicity the upper part has been omitted, since it is a repetition of Fig.5.

Figs.7,8 and 9 respectively are views showing the vertical piece 5 corresponding to the right-hand side (as seen from the front of the drawer) in its front elevation, rear elevation and internal and external side elevations (in respect of its assembly position).

Fig.10 is a plan view of the right-hand vertical piece 5, in accordance with the section X-X through Fig.8.

Fig.11 is a plan view of the right-hand vertical piece 5, in accordance with the section XI-XI through Fig.7. It also provides an operational diagram of the horizontal piece 6 and the transversal shaft 7 in the "gripping" position.

Figs.12,13 and 14 respectively constitute views of the horizontal piece 6 in front elevation, side elevation and lower plan view.

Figs.15,16,17 and 18 constitute views of the transversal shaft 7, corresponding respectively to a side elevation (with the piece in the horizontal position) and respective right-hand and left-hand front views corresponding to the preceding view, and a partially cut-away upper plan view.

The numbered components shown in these drawings are as follows:

- 1: Drawer body.
- 2: Front of drawer or front panel.
- 3: Upper engagement bridge.
- 4: Lower engagement bridge.

- 5: Vertical piece.
- 6: Horizontal piece.
- 7: Transversalshaft.
- 8: Vertical groove of bridge 4.
- 9: Penetration head of piece 5.
- 10: Anchoring boring.
- 11: Anchoring screw.
- 12: Housing of the shape of an inverted "T."
- 13: Cylindrical orifice of piece 5.
- 14: Cylindrical orific. of piece 5.
- 15: Terminal wing.
- 16: Stop.
- 17: Penetration head of piece 6.
- 18: Grooved face.
- 19: Base plate.
- 20: Vertical rib system.
- 21: Opered window.
- 22: Lead or expansion of shaft 7.
- 23: Bar of shaft 7.
- 24: Front cavity.
- 25: Peripheral projection.
- 26: Cam.
- 27: Cylindrical portion of shaft 7.
- 28: Cylindrical portion of shaft 7.
- 29: Side rail.

EXPLANATION OF AN EMBODIMENT OF THE INVENTION IN DETAIL.

The attached drawings illustrate a preferred version of the adjustable connection device suggested between a drawer body 1 and a front drawer panel 2 for furniture.

As may be seen from Figs.1 and 5, the device preferably consists of two assemblies positioned close to the sides of the body 1 (Fig.1) and each consisting of an upper engagement bridge 3, a lower engagement bridge 4, a vertical piece 5, a horizontal piece 6 and a transversal shaft 7.

As shown by Figs.2 and 3, the upper and lower engagement bridges 3 and 4 respectively are incorporated into the drawer body 1 itself and have been produced by the same moulding operation as this latter. Both engagement bridges 3 and 4 are open at the bottom and closed at the top and delimited by a lateral surface which is continuous in the upper bridge 3 and which in the lower bridge 4 has a vertical groove 8 designed to enable the vertical rib system 20 of the horizontal piece to move longitudinally in operation. The front width of both engagement pieces 3 and 4 is greater than the width of the penetration heads 9 and 17 of the vertical and horizontal pieces 5 and 6, while the vertical height of the bridges is sufficient to enable the degree of penetration to be varied within ample limits, all these features enabling the relative position between the body 1 and the front 2 to be regulated in the horizontal, vertical and angular directions.

The vertical piece 5, as may be seen from Figs.8-11, basically consists of a penetration head 9 in the upper bridge 3, two borings 10 for respective anchoring screws 11 at the back of the front panel 2 (Fig.5) and a housing 12

of the shape of an inverted "T", with walls slightly convergent towards the base and capable of receiving the vertical rib system 20, its lateral walls having cylindrical transversal orifices 13 and 14 respectively, the diameters of these latter corresponding to those of the cylindrical end portions 27 and 28 of the bar of the transversal shaft 7.

On the side outside the drawer the vertical piece 5 has a terminal wing 15 of which the lower part is cut in such a way as to define the stops 16 for the angular travel of the transversal shaft. If intermediate engagement assemblies were provided between the two sides the former would not require the terminal wing 15, but the cuts defining the stops 16 would still be provided. This terminal wing 17 gives the side of the drawer, when it is open, an aesthetically pleasing appearance.

The horizontal piece 6, as may be seen from Figs. 12-14, consists of a penetration head 17 with its active face grooved, as shown by 18, a base plate 19 and a vertical rib system 20 which can be positioned and moved operatively in the housing 12 and which is orthogonal to the said grooved face 18 and base plate 19. The vertical rib system 20 has a vertically opened window positioned to accommodate and allow of the actuation of the cam 26 of the transversal shaft 7.

Figs. 15-18 show the transversal shaft 7, which basically consists of a head 22 or plane extension and a stepped bar 25. The head 22 has a front cavity 24 to enable a rotating tool to be applied thereto and a peripheral protuberance 25 which provides a means of determining, in conjunction with respective

stops 16, provided by hollowing out the external side of the vertical piece 5, the ends of the angular travel of the shaft 7. The bar 23 has a central portion taking the form of a cam 26, capable of operatively positioning itself in the opened window 21, and also respective cylindrical portions 27 and 28, capable of operatively positioning themselves in the cylindrical orifices 13 and 14.

The proposed device operates in a simple manner, consisting first and foremost of securing to the front 2 the vertical piece 5 which will accommodate the horizontal piece 6 in the release position (Fig. 5), i.e. the position corresponding to the support of the projection 25 against the front stop 16 in the clockwise direction; the penetration heads 9 and 17 are then fitted into the engagement bridges 3 and 4; finally, it is sufficient to rotate the transversal shaft 7, raising the projection 25 towards the rear stop 16 (in the clockwise direction), so that the cam 26 will act on the opened window 21, thus bringing about a greater penetration (Figs. 4, 6 and 11) of the vertical rib system 20 into the housing 12, which will cause the front walls of the engagement bridges 3 and 4 to be gripped, the body 1 and the front of the drawer thus being firmly interconnected.

If it is desired to dismantle the said connection or adjust the installation position it will be sufficient to nullify the rotation for the gripping action to enable the relative position of the body 1 and the front 2 to be easily regulated in all directions within the plane of connection.

CLAIMS

1. A device for the adjustable connection of a front panel to a drawer body for furniture, comprising a pair of engagement members each defining a channel, the engagement members forming part of or being adapted to be secured to one of the drawer body and the front panel one above the other with the channels opening in a common direction and spaced horizontally from one another, a fixing assembly comprising first and second inter-engagable fixing pieces, the first of which is formed as part of or is adapted to be secured to the other of the drawer body and front panel, each fixing piece having a head which when the pieces are loosely inter-engaged is slidable as a loose fit into a respective one of the channels, and means for expanding/contracting the fixing assembly so as to lock the fixing pieces relative to one another and the walls of the channels to fix the fixing assembly in the channels.

2. A device for adjustable connection of a front panel to a drawer body for furniture, comprising a number of assemblies, preferably two, each consisting of two engagement members, an upper one and a lower one, constructed in the body of the drawer, one above the other and offset horizontally, and a fixing assembly of two pieces, a vertical one and a horizontal one, the vertical piece being secured to the front panel of the drawer, these pieces being capable of being joined to each other at right angles and interconnected by means of a transversal shaft provided with a cam, the two pieces having heads for vertical penetration into channels formed by the engagement members the width of the heads being smaller than that of the channels of the engagement members, so that the heads of the two pieces can be caused to penetrate the respective channels from the bottom upwards and in this position the panel can be adjusted relative to the drawer both in the horizontal and the vertical direction, and thereafter by rotating the eccentric shaft, a tractive force can be applied to the horizontal

piece resulting in close engagement with the walls of the engagement members, thus fixing the panel to the drawer in the selected position.

3. A device according to Claim 2 in which the active face of the penetration head of the horizontal piece is grooved and prolonged in the form of a body of the shape of an inverted T converging towards the end which connects with the vertical piece, the said body forming a base plate and a vertical rib system, containing a window which is open vertically and in which the cam of the transversal shaft acts, the wall of the lower engagement member having a vertical groove of a width greater than the thickness of the vertical rib system of the horizontal piece, this rib system ensuring the suitable behaviour of the piece in the traction exerted for securing purposes, when the wall of the lower engagement member is gripped between the grooved surface and the rear edge of the vertical piece.

4. A device according to Claim 3 in which the vertical piece is provided with a housing of the shape of an inverted T formed by the body of the horizontal piece and respective cylindrical orifices are formed coaxially face to face between which the vertically opened window can position itself in order to receive the transversal shaft for assembling the horizontal and vertical pieces.

5. A device according to Claim 4 in which the transversal shaft consists of a bar with respective cylindrical end portions dimensioned to enable them to rotate in the face to face orifices, the cam being provided between the cylindrical portions and having a diameter in accordance with the opened window in which it acts, the transversal shaft terminating at one end in an enlarged part having a cavity for insertion of a tool for its rotation and having a peripheral projection which in conjunction with respective stops on the vertical piece determines the end of the angular travel of the eccentric shaft.

6. A device according to any of Claims 2 to 5 in which

the vertical pieces closest to the sides of the drawer body have in relation to one another a symmetrical configuration whereby the vertical pieces have a terminal wing on their side facing towards the exterior of the drawer, the profile of the wing being in accordance with the cavity between the front panel and the body of the drawer thus ensuring an aesthetically pleasing finish to the visible sides of the drawer when it is open, preferably the indentations for the operation of the transversal shaft being situated in this visible wing.

7. A device according to any of Claims 1 to 6 in which the levelling of the panel in the vertical direction is affected by selecting the appropriate degree of penetration of the heads into the engagement members.

8. A device according to any of Claims 1 to 7 in which the adjustment of the panel in the horizontal direction is allowed by the play between the heads and the engagement members.

9. A device for adjustable connection of a front panel to a drawer body for furniture substantially as described herein with reference to or as illustrated in the accompanying drawings.

10. Furniture incorporating a device and drawer according to any of Claims 1 to 9.